Illinois Department of Transportation
2300 South Dirksen Parkway / Springfield, Illinois / 62764

Subject:
Pile Splices

CONSTRUCTION MEMORANDUM NO. 00-44

Effective: **May 5, 2000**

Expires: **Indefinite**

This Memorandum supersedes Construction Memorandum 97-44, dated May 1, 1997. This is a joint Construction/Bridges and Structures policy memorandum.

The Standard Specifications, Articles 512.04(a) and 512.05(b), permit metal pile to be field spliced subject to the welder qualification requirements of Article 512.07 for HP piles and the applicable welding requirements of Article 505.04(q). There are, however, several requirements for materials, procedures and welder qualifications. The purpose of this Construction Memorandum is to provide the Resident an outline of those requirements.

The plans may limit or prohibit splices in piling if the bridge is designed to seismic standards. For bridges in seismic areas, the seismic category will be noted on the structure plans and seismic splice requirements will be included in the general notes of the bridge plans. Only certain seismic categories (B and C) require splices that will withstand seismic loadings. All structures falling within the area with an acceleration larger than 9.0% will require seismic detail or notes. See sheet 21. Districts 7, 8 and 9 are in seismic areas.

Seismic category (A) encompasses the region north of the 9.0% horizontal acceleration line. No seismic details or notes will be shown on these projects.

Commercial splicers have been approved for pile splicing for seismic design in accordance with the splicing details shown on sheets 19 and 20. Full butt welding of the entire cross section and the standard steel pile field splice (Sheet Nos. 7 and 8) are also acceptable. Any other proposed splices for seismic plans must be approved by the Bureau of Bridges and Structures.

SPLICING HP STEEL PILING

Unless otherwise specified in the contract plans, HP Steel Piling may be spliced by any of the following procedures:

1. Commercial Splicers.

   (a) In footings below ground in areas other than seismic categories B and C, pre-approved splicers (such as Champion BP-30,000) are approved for use without Bureau of Bridges and Structures review. (See Sheet 13)

   NOTE: Flange preparation shall consist of the lower pile cut square and the upper pile beveled.

(b) For pile bent piers, above ground to 3 m (10 ft) below ground commercial splicers, whether in a seismic area or not, shall be installed in accordance with commercial HP pile splicers details for seismic performance categories B and C.

(c) In seismic categories B and C, commercial splicers shall be installed in accordance with commercial HP pile splicers details for seismic performance categories B and C.

(d) Any other commercial splicer designs shall be submitted with a sample of the splicer for approval prior to their use.

2. Department's Standard Steel Pile Field Splice - (see Sheets 7 and 8 of this Memorandum).

3. Full penetration butt welding of the entire cross section.

4. Any alternate design shall be approved by the Bureau of Bridges and Structures.

SPLICING METAL SHELL PILING

Unless otherwise specified in the contract plans, metal shell piling may be spliced by any of the following procedures:

1. Commercial Splicers -

(a) Pre-approved splicers (such as Advance S-18,000) are allowed for footing piles below ground in areas other than seismic categories B and C.

(b) For pile bent piers above ground to 3 m (10 ft) below ground commercial splicers, whether in a seismic area or not, shall be in accordance with commercial metal shell pile splicers details for seismic performance categories B and C.

(c) In seismic areas, categories B and C, commercial splicers shall be used in accordance with the commercial metal shell pile splicers details for seismic performance categories B and C.

(d) Other commercial splicer designs shall be submitted with a sample of the splicer for approval prior to its use.

2. Full penetration butt welding, using continuous backing ring.

3. Any other proposed splice above the ground shall be submitted to the Bureau of Bridges and Structures for approval.

The Champion BP-30,000 and Advance S-18,000 commercial splicers are manufactured by the Associated Pile and Fitting Corporation of Clifton, New Jersey. Commercial splicers are more economical to install than the pile splicers shown on the Standards. Commercial splicers which are readily available save the Contractor as well as the Department money.

SPLICING STEEL PIPE PILE

This is heavy walled, high strength pipe designed for load bearing without concrete fill. If splicing is required, specialized weld procedures shall be prepared and submitted by the Contractor to the Bureau of Bridges and Structures for review. Welders must qualify for joint, material and position as directed by the Engineer.

WELDER QUALIFICATIONS

Approved commercial splicers fabricated for use with HP steel piling require both flanges to be welded with full penetration butt welds. Welders must be qualified by test in accordance with the requirements of Article 505.04(q)(4) of the Standard Specifications. If not previously qualified for horizontal groove welds, welders shall be tested in accordance with Sheets 4 through 6 by an independent testing agency acceptable to the Engineer. The only exception to the welder qualification requirements is for HP steel test piling driven outside the bridge abutment or pier and not to become part of the structure.

If the Contractor elects to use the Department's Standard Steel Pile Field Splice, the welders need to be qualified for fillet welding in the positions used for field splicing. To qualify welders without acceptable evidence of prior qualification for these welds, coupons should be prepared and tested in accordance with Sheets 9 and 10. These coupons can be broken and evaluated in the District, sent to the Bureau of Materials and Physical Research or to an independent agency acceptable to the Engineer for testing at the Contractor's expense. Each welder the Contractor proposes to use should be qualified prior to welding piling splices.

When the full penetration butt welding option is chosen by the Contractor for HP splices, the same welding requirements as stated in paragraph one under WELDER QUALIFICATIONS shall apply. If this splicing is done while the pile is in the vertical position, clips or clamps shall be used to assure proper axial alignment of the abutting sections of the pile.

Welding of HP piling shall be done against backing or backgouged for second side welding.

Welder qualification requirements are waived for splicing of metal shell piling not subject to seismic loading. Structures subject to seismic loading will require welder qualification for the positions and processes used in splicing the pile.

Qualifying welders in accordance with the requirements of this Memorandum does not necessarily qualify welders to do other types of field welding that may be required.

Gary Gould
Engineer of Construction

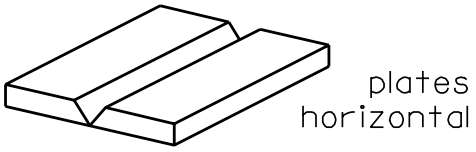
Ralph E. Anderson, P.E., S.E.
Engineer of Bridges and Structures

Welder Qualification - Pile Groove Welds

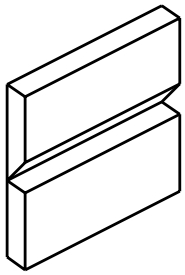
Welder shall qualify for:

(1) Process being used (e.g. shielded metal arc welding (SMAW)). The Standard Specifications, Article 505.04(r), allow the use of SMAW (E7016, E7018 or E7028 electrodes) and FCAW (E7XT-6 or E7XT-8 electrodes). E7028 may be used only in the horizontal position.

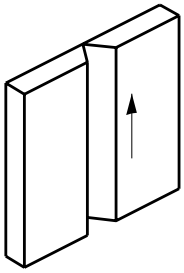
(2) Welding for welder qualification can be done with the test groove in the following positions:



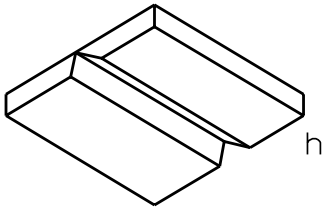
FLAT (F)



HORIZONTAL (H)



VERTICAL (V)



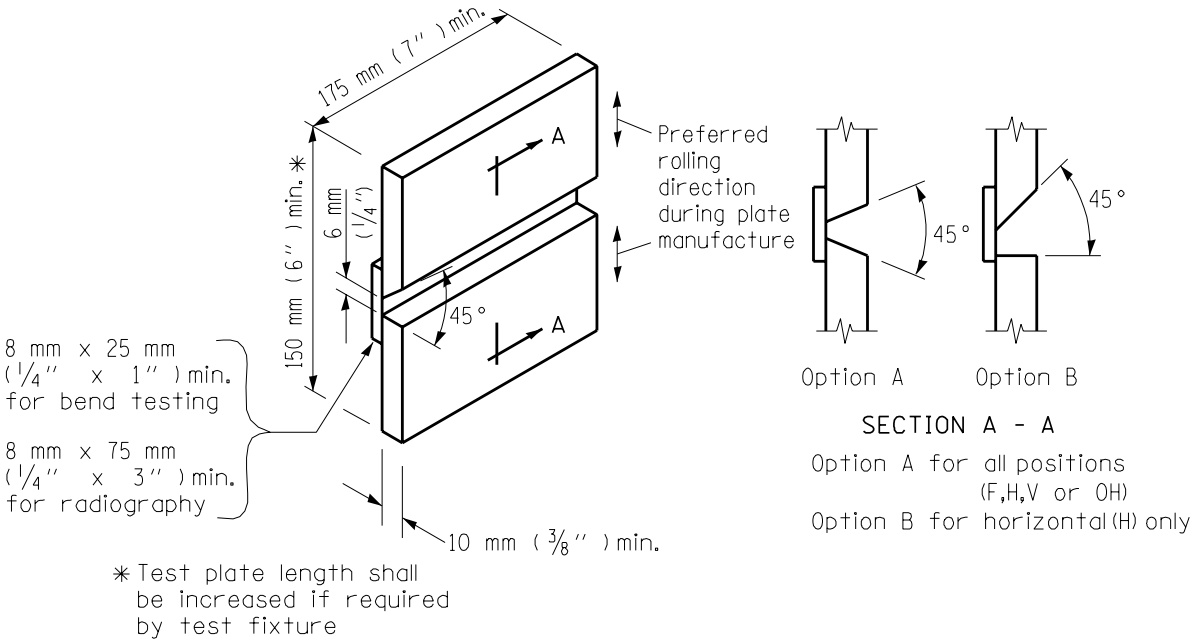
OVERHEAD (OH)

NOTE: (a) If a butt weld is to be made with the pile vertical, the welder's qualifying position must be the horizontal (H) position.

(b)

Qualification Position of Groove Weld:	Qualifies for Groove Welding in:	Qualifies for Fillet Welding in:
F	F	F, H
H	H, F	H, F
V	V, H, F	V, H, F
OH	OH, F	O, H, F

(c) Qualification with a E7016, E7018 or E7028 electrode qualifies the welder to use all three electrodes.



Method of Testing Test Specimen

The welded specimen may be tested for qualification either by:

1. Radiographing middle 115 mm (4½") test plate weld; or,

NOTE: No tack welds allowed in test area.

2. Making 1 root bend and 1 face bend test specimen. (See Sheet 6)

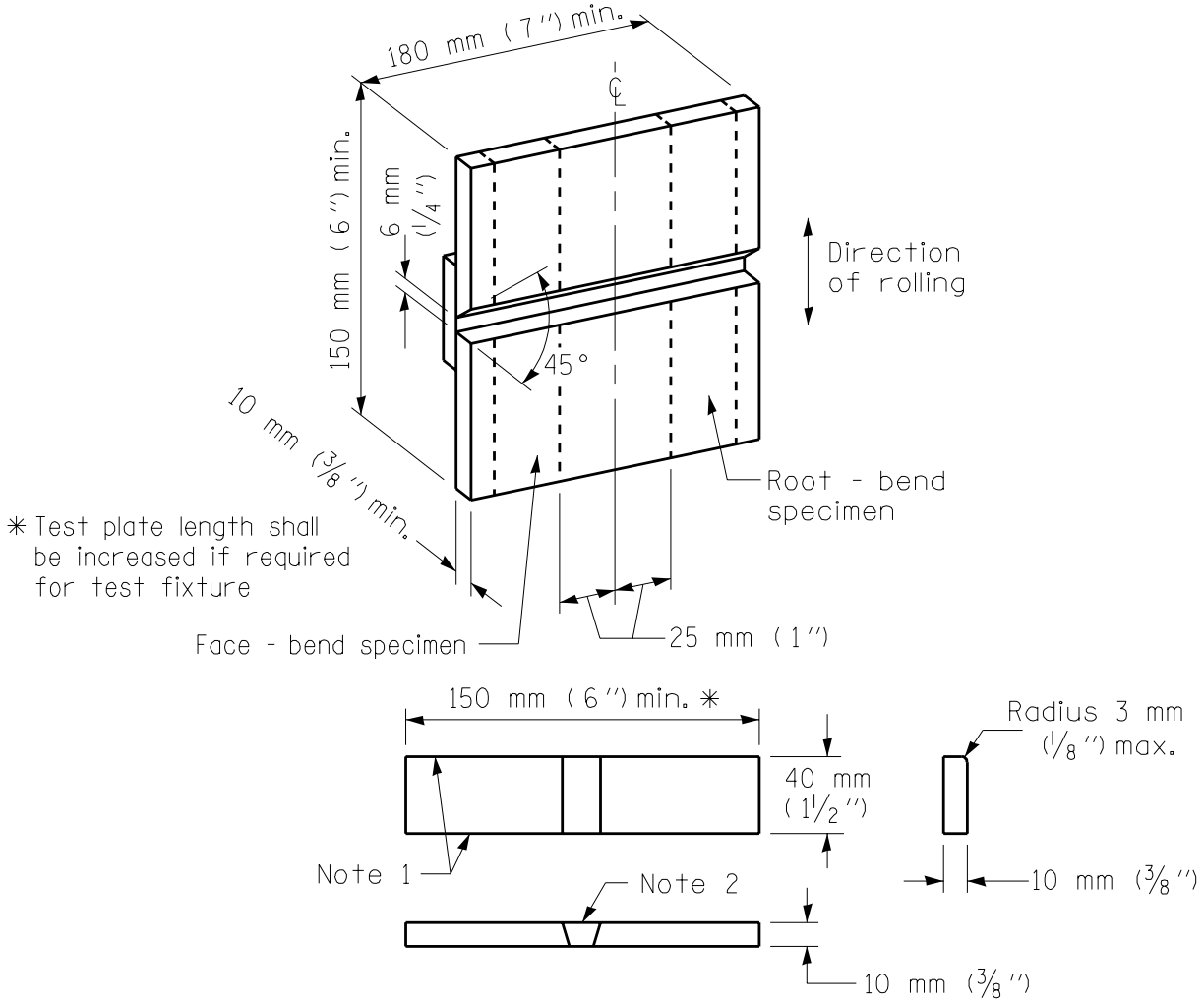
Test Results Required

If radiography is used as method of testing, the weld as revealed by the radiograph shall satisfy the requirements of 9.25.2.2 and 9.25.2.3 of AASHTO/AWS D1.5.

If root and face bend tests are made, the specimens shall satisfy the requirements of 5.29.1 of AASHTO/AWS D1.5.

Period of Effectiveness

The qualification remains in effect indefinitely unless the welder is not engaged in welding on a relatively normal basis during any 6-month period or there is some specific reason to question the welder's ability.

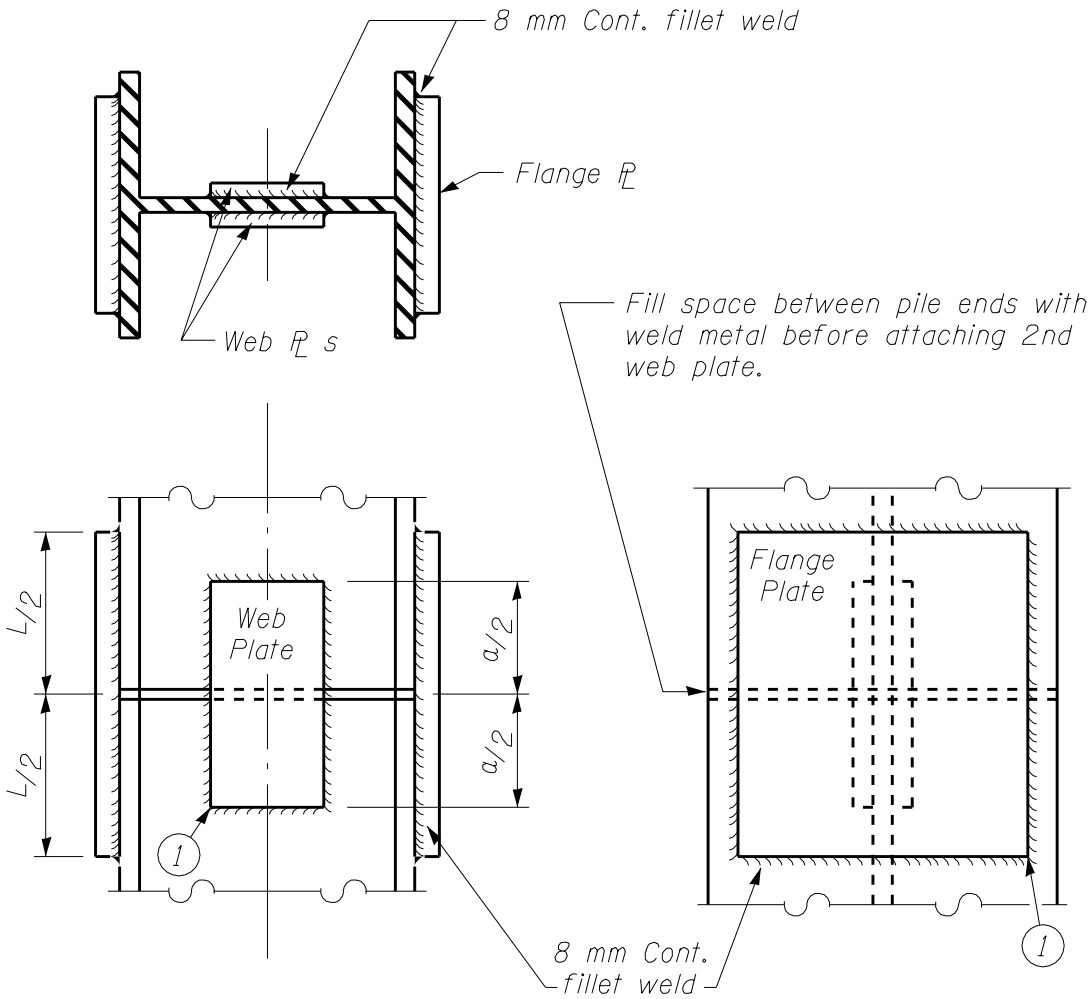


FACE and ROOT - BEND SPECIMENS

NOTES:

1. These edges may be oxygen-cut and may or may not be machined.

2. The weld reinforcement and backing shall be removed flush with the surface of the specimen. At least the final 3 mm (1/8") of backing shall be removed by grinding or machining parallel to the long dimension.



SPLICE PLATES REQUIRED

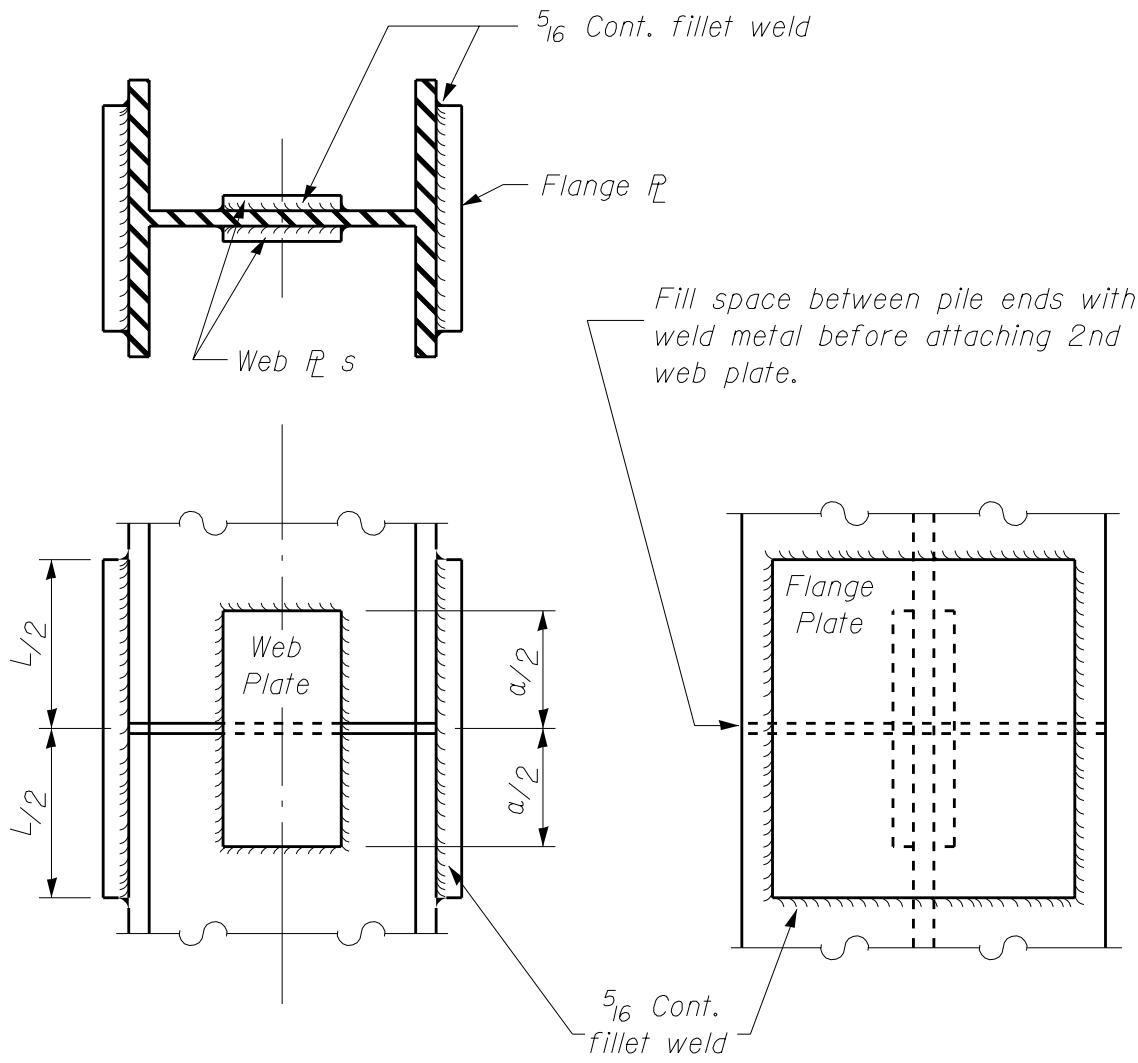
Pile Size (2)	2 Web Plates	2 Flange Plates
HP 200x53	80 x 14 x 230	185 x 16 x 560
HP 250x62	130 x 10 x 260	235 x 14 x 660
HP 310x79	150 x 10 x 310	280 x 16 x 820
HP 360x174	200 x 20 x 410	355 x 25 x 1020

Note: Details are not to be shown on the plans.

NOTES: (1) Plates may have 90° corners or be radiused/beveled 20 mm to facilitate welding around perimeter.

(2) For pile sizes not shown, proposed configurations and lengths shall be submitted to the Engineer for approval.

STANDARD STEEL PILE
FIELD SPLICE

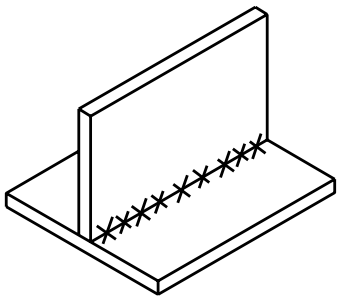


SPLICE PLATES REQUIRED

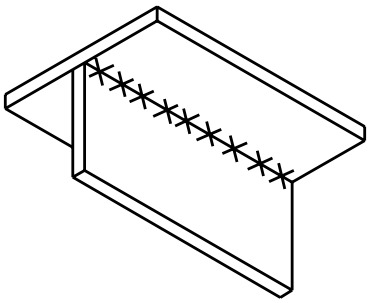
Pile Size	2 Web Plates	2 Flange Plates
HP 8x36	3" x 1/2" x 0'-9"	7 1/4" x 5/8" x 1'-10"
HP 10x42	5" x 3/8" x 0'-10"	9 1/4" x 9/16" x 2'-2"
HP 12x53	6" x 3/8" x 1'-0"	11" x 5/8" x 2'-8"
HP 14x117	8" x 3/4" x 1'-4"	14" x 1" x 3'-4"

Note: Details are not to be shown on the plans.

STANDARD STEEL PILE
FIELD SPLICE

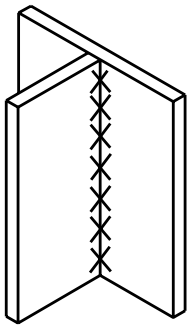


HORIZONTAL (H)

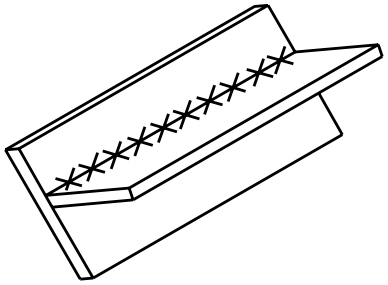


OVERHEAD (OH)

Note (c)



VERTICAL (V)



FLAT (F)

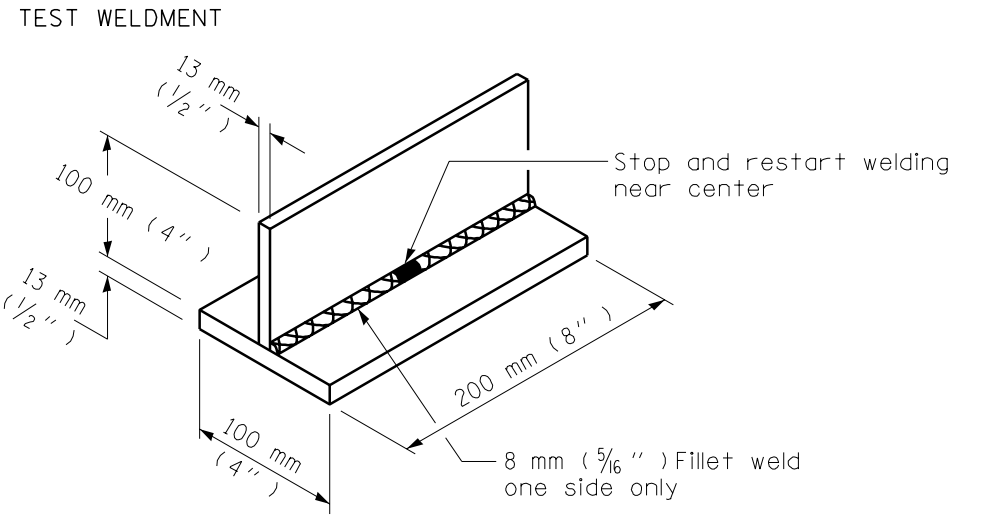
Welders Qualification - Fillet Welds

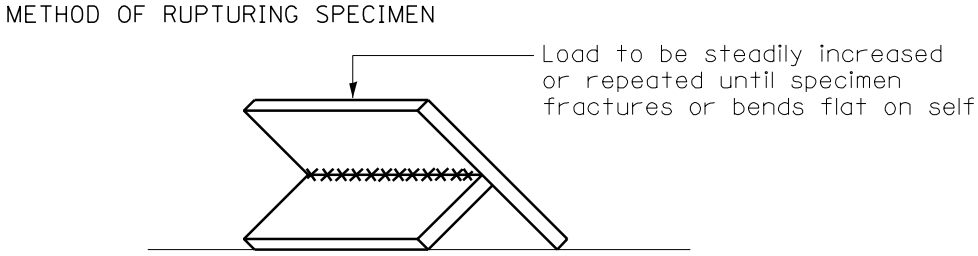
Welders shall qualify for:

1. Process used (e.g. shielded metal arc welding (SMAW))

   The Standard Specifications, Article 505.04(r), allow the use of SMAW (E7016, E7018 or E7028 electrodes) and FCAW (E7XT-6 or E7XT-8 electrodes). E7028 may be used only in the horizontal position.

2. Welding for welder qualification can be done with the fillet weld in the following positions:





NOTE: (a) If a butt weld is to be made with the pile vertical, the welder's qualifying position is the horizontal (H) position.

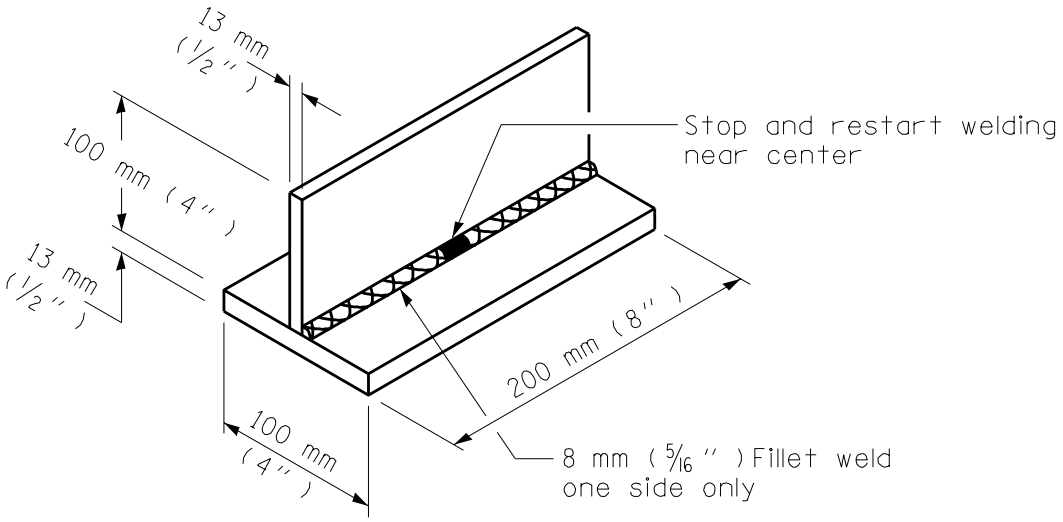
(b)

Qualification Position Of Fillet Weld:	Qualifies for Fillets in:
F	F
H	H, F
V	V, H, F
OH	OH, H, F

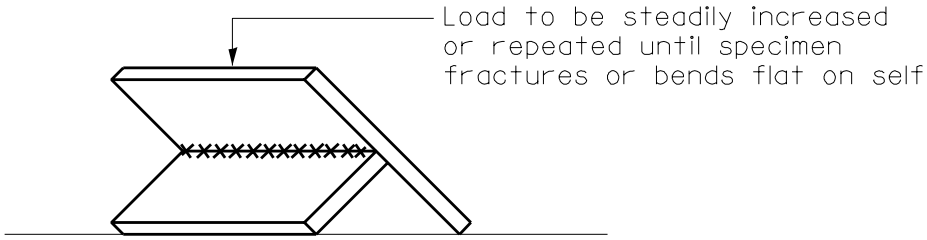
(c) Weld up only for vertical position in qualification and production.

(d) Qualifying with either a E7016, E7018 or E7028 electrode qualifies welder to use all three electrodes.

TEST WELDMENT



METHOD OF RUPTURING SPECIMEN



Test Results Required

Visual - Weldment shall present a relative uniform appearance and shall be free of overlap, cracks and excessive undercut. There shall be no porosity visible on the surface. (See Sheets 14 through 16 for explanation)

Fracture - The specimen shall pass if it bends flat upon itself. If the weld fractures, the fractured surface shall show complete fusion to the root of the joint and shall exhibit no inclusion or porosity larger than 2 mm (3/32") in greatest dimension. The sum of the greatest dimension shall not exceed 10 mm (3/8") in the middle 150 mm (6") length of the specimen.

Period of Effectiveness

The qualification remains in effect indefinitely unless the welder is not engaged in welding on a relatively normal basis during any six-month period or there is some specific reason to question the welder's ability.

Sheet 13 contains a sample welding Form BC-2015. The following data is required and is to be provided by the person witnessing the welding of the test specimen:

1) Welder's Name
2) Welding Process (e.g., Shielded Metal Arc Welding- SMAW)
3) Method (Manual)
4) Position (See Sheet 4 or 9)
5) Material Spec: AASHTO - M270M, G250 or M183 (ASTM A-709M, G250 or A-36)
6) Joint Thickness - 10 mm (3/8") (or more) for groove welds, not applicable for fillets.
7) Thickness Range this Qualifies: All HP bearing pile sizes.
8) Preheat (Test procedures and field welding must satisfy minimum preheats specified in Table 4.4 of AASHTO/AWS D1.5. 20°C (70° F) should be adequate for all piles.)

Filler Metal

1) Specification No. - AWS A5.1/A5.1M or AWS A5.20/A5.20M
2) Classification (See electrode being used - eg.: E7018)
3) Is backing strip used - (Groove Weld - Yes)
   (Fillet Weld - No)
4) Filler Metal Diameter & Trade Name (See electrode container)
   Trade name not required if not available

After the specimen has been welded and the data recorded, Form BC-2015, a copy of the test data form shall accompany the specimen to the testing lab. The test results and pertinent data shall be added to the test record form, duly signed as required and returned to the project.

Illinois Department of Transportation

Qualification For Welding
Steel Bearing Pile Splices Only

Welder and Welding Operator Qualification Test Record

Welder or welding operator's name JOHN DOE Identification no. _____
Welding process SMAW Manual ✓ Semiautomatic _____ Machine _____
Position HORIZONTAL
(Flat, horizontal, overhead or vertical - if vertical, state whether upward or downward)
In accordnace with procedure specification no. _____
Material Specification AASHTO M270M GR 250
Diameter and wall thickness (if pipe) - otherwise, joint thickness N/A
Thickness range this qualifies ALL H-PILE THICKNESS

EXAMPLE

Filler Metal

Specification no. AWS 5.1 Classification E7018 F no. _____
Describe filler metal (if not covered by AWS specification) _____
Is backing strip used? YES
Filler metal diameter and trade name 1/8" ϕ LINCOLN (LH-70) Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

Guided Bend Test Results

Type	Result	Type	Result

Test conducted by _____ Laboratory test no. _____
per _____

Fillet Test Results

Appearance _____ Fillet size _____
Fracture test root penetration _____ Macroetch _____
(Describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by _____ Laboratory test no. _____
per _____

Radiographic Test Results

Film Identification	Results	Remarks	Film Identification	Results	Remarks

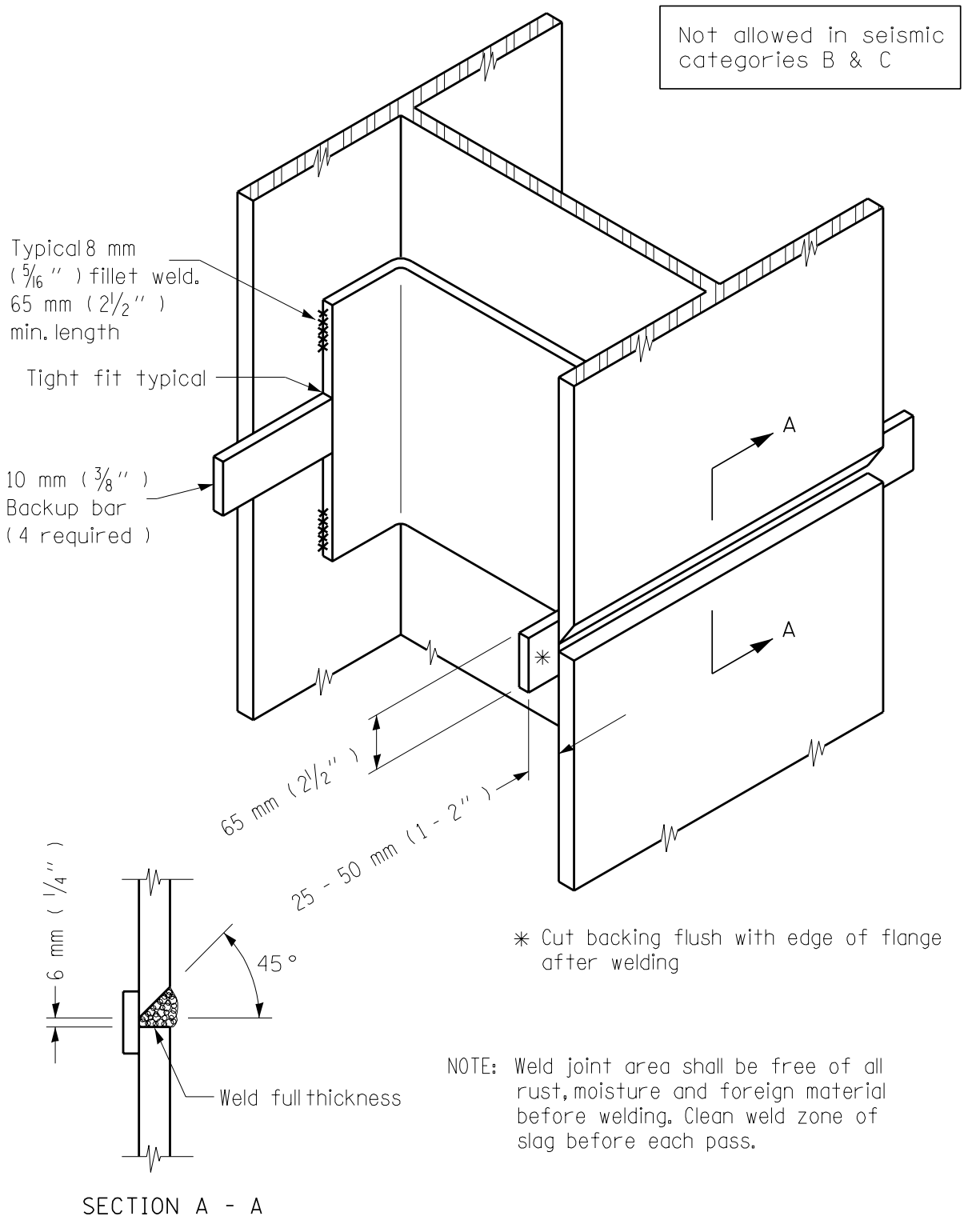
Test witnessed by _____ Test no. _____
per _____

We the undersigned certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D 1.1, Structural Welding Code.

Witness of Qualification John Clark of IDOT/D-3

Witness of Testing _____ of _____

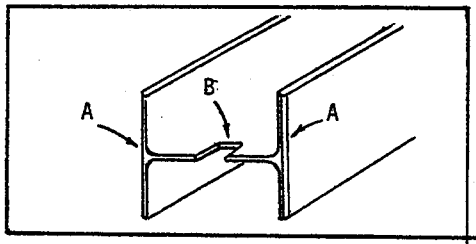
BC-2015


Not allowed in seismic categories B & C
Typical 8 mm (5/16 ") fillet weld. 65 mm (2 1/2 ") min. length
Tight fit typical
10 mm (3/8 ") Backup bar (4 required)
A
A
65 mm (2 1/2 ")
25 - 50 mm (1 - 2 ")
* Cut backing flush with edge of flange after welding
6 mm (1/4 ")
45 °
Weld full thickness
NOTE: Weld joint area shall be free of all rust, moisture and foreign material before welding. Clean weld zone of slag before each pass.
SECTION A - A

details of assembly

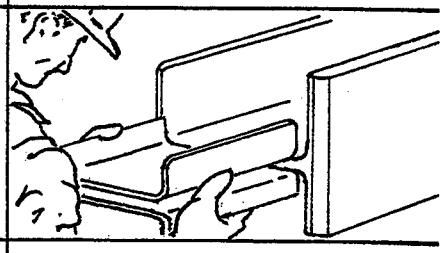
THE CHAMPION

STEP 1 -

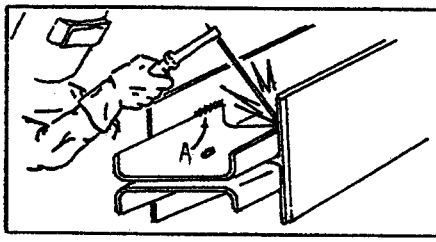


With the beam in a horizontal position on the ground scarf outside edges of flanges (A) and torch cut a notch in the web (B) to accommodate the key. Notch 7/8" x 2".

STEP 2 - Insert the splicer sleeve between the beam flanges with the web between the channels. With a sledge hammer drive the sleeve until the key seats in the notch.

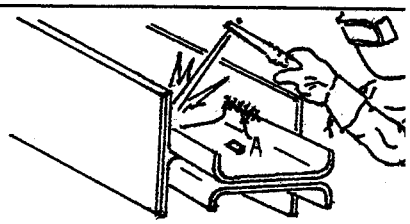


STEP 3 -

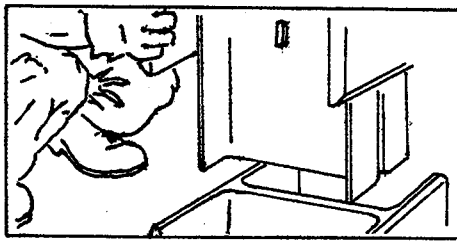


Tack weld the flange of the channel (A) to the flange of the beam (2 1/2" weld) on both sides starting at the extreme end of the channel. Use 5/16" fillet weld.

STEP 4 - After several beams are prepared according to step 3 turn the beams over (rotate 180 degrees) and tack weld the channels on this side of the beam as in step 3.

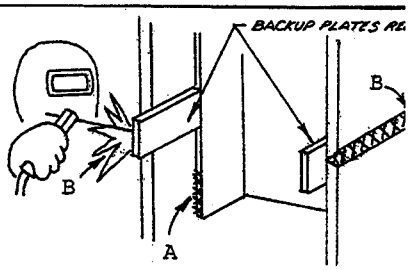


STEP 5 -



When a splice is to be made hoist a prepared section into the leads guide the sleeve into position and tap with the pile hammer to close the gap between the beams.

STEP 6 - Tack weld the flange of the channel (A) to the flange of the beam as in Step 3. Weld outside flange with full penetration butt weld (B).



GENERAL NOTES:

1) No welding shall be done when the ambient temperature is below -17°C (0° F) or when the surfaces are exposed to rain, snow or high winds.

2) When the ambient temperature is below 10°C (50° F), preheat the material with a heating torch to a minimum of 20°C (70° F) and maintain during welding. Preheat of material is one of the best deterrents of weld cracking. (Warm to touch 38°C (100° F) - Bare hand cannot be held in firm contact for more than 10 seconds 60°C (140° F)±)

3) Prior to welding, the joint shall be clean and dry and shall be free of all mill scale, rust, moisture and all foreign matter. (Grind surfaces to bright metal.)

4) Electrodes shall be kept dry. The coatings of these electrodes can absorb moisture. According to American Welding Society (AWS) specifications, electrodes are to be purchased in hermetically-sealed containers, and once opened, those electrodes not used immediately shall be placed in storage ovens at 120°C (250° F) until used. Also, no electrodes are to be exposed to the atmosphere for more than 4 hours. As one can note, these stringent specifications indicate the necessity for keeping electrodes dry, as moisture in electrodes can lead to cracking and porosity in the weldment. For field welding, the use of storage ovens will not be considered necessary provided that:

   a) electrodes in hermetically-sealed containers are stored in warm, dry places.

   b) only one container is unsealed at a time and no others opened until all electrodes of the previously-opened container are used or discarded.

   c) the welder will only take enough electrodes from the container for two or three hours use.

   d) the open container is re-closed against weather while it contains electrodes (e.g. tape closed lid)

   e) electrodes that become wet or electrodes previously re-dried that have not been used within 4 hours of exposure will be discarded.

   f) electrodes from containers open (unsealed) more than 4 hours may be re-dried once by baking at 230°C to 260°C (450° F to 500° F) for 2 hours, then held at 115°C to 130°C (240° F to 265° F) until not more than 4 hours before actual use.

5) The welder shall clean each weld pass prior to making the next pass.

6) Weld procedure specifications (WPSs) shall utilize the electrode manufacturer's recommended ranges for amps, volts, stickout, etc.

The above notes are specification requirements of AWS which are a part of the contract specifications. They, in essence, are guidelines considered necessary for producing welds free of injurious type defects, such as cracks, lack of fusion, porosity and slag inclusions. When followed, a qualified welder should be able to produce welds acceptable for the HP splices.

Following are some of the common types of defects found in welding (See Figure 1).

OVERLAP

Description Overlap, also called roll-over, is an imperfection at a toe of a weld caused by an overflow of weld metal onto the surface of the base metal without fusing to it. An excess of weld metal extends beyond the limits of fusion at the surface of the plate. This condition may exist intermittently, or it may occur continuously along the welded joint. It is more often associated with fillet welds and results in an apparent increase in the size of the fillet weld. (Figure 1, Number 7)

Cause and Prevention. The defect frequently arises from an incorrect manipulation of the electrode. For example, in flat or horizontal fillet welding, the use of a wrong electrode angle will allow the weld metal to flow away from the fusion zone. Also, using too large an electrode for the position, selecting incorrect welding current and attempting too large a deposit in a single pass are contributing factors.

The welding speed employed should result in adequate fusion at the toes of a weld. Too low a welding speed may result in the weld metal flowing beyond the fusion zone and should be avoided. Too high a current may cause an increased melting rate of the overheated last portion of the electrode.

Single pass fillet welds should not be larger than 8 mm (5/16") in leg size since larger passes tend to sag toward the base and cause overlapping at the toe of the horizontal leg. For fillet welds larger than 8 mm (5/16"), more than one run is generally required; the exact number depends on the type of electrode and welding technique used.

UNDERCUT

Description. Undercut is the condition in which a local reduction in section of the base metal occurs alongside the weld deposit. The fault generally appears as a groove, either continuous or discontinuous. This condition may occur either on the surface of the base metal at the toes of a weld, or in the fusion faces of multiple-pass welds. (Figure 1, Number 5).

Cause and Prevention. Undercutting is most commonly associated with the use of excessive welding current, but is also caused frequently by the welder using an unsuitable type of electrode or an incorrect technique such as too rapid a welding speed, excessive side manipulation, too long an arc, or wrong angle of electrode.

POROSITY

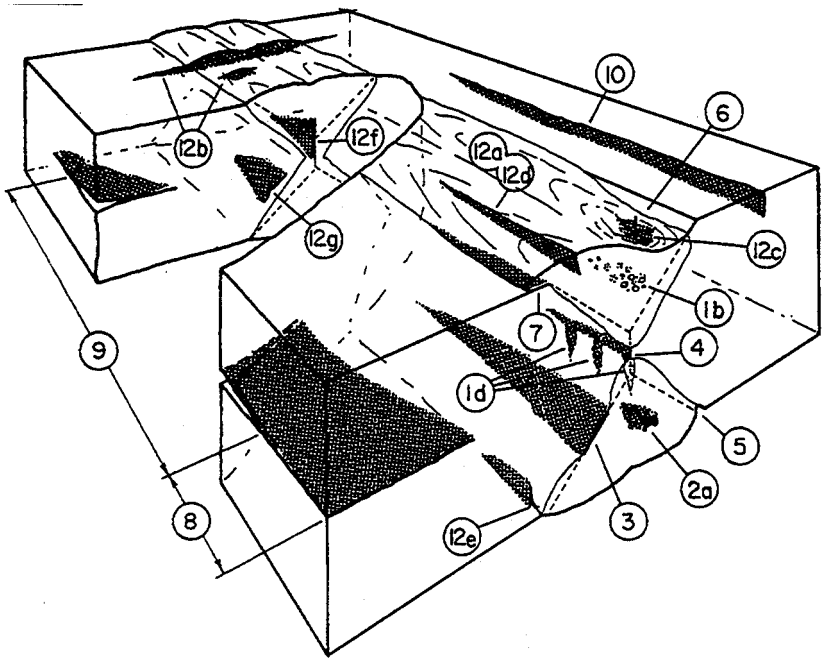
Description. Porosity is the presence of cavities in the weld metal caused by the entrapment of gas. In general, porosity takes the form of small spherical cavities, either scattered throughout the weld or clustered in local regions. In some cases, "wormholes," elongated or tubular gas cavities, or "blowholes," large, round, isolated gas cavities, may be present in the weld. These may be partially filled with slag. (Figure 1, Number 1).

Cause and Prevention. The formation of porosity is caused by entrapment of gas evolved during the welding process. A number of factors contribute to the occurrence of this defect. Contamination of the parent plate and electrode is important, particularly with regard to sulfur which is present in lubricants and rubber products, and readily promotes the formation of porosity. Excessive moisture on the surface or in the electrode covering will also give rise to this defect; stored electrodes must be maintained in a dry condition. If they become affected by dampness but are not otherwise damaged, they should only be used after being dried out in a manner approved by the manufacturer. All plate surfaces near the weld area must be free of moisture, paint, oil, grease, dirt and other foreign material.

LACK OF FUSION

Description. Lack of fusion is a condition in which unfused boundaries exist either between the parent metal and weld metal or between adjacent layers of weld metal. The term should not be confused with lack of penetration.

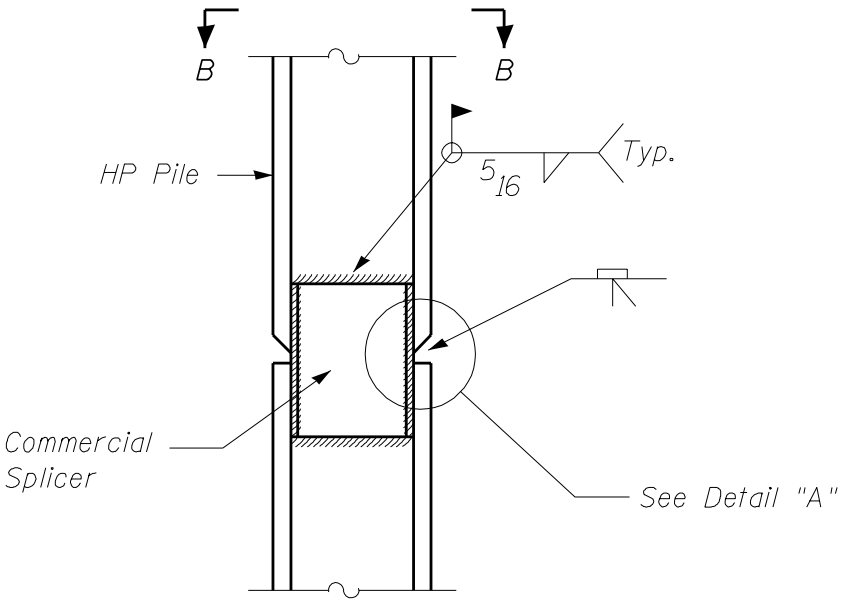
Cause and Prevention. Figure 1, Number 3 shows an example of lack of fusion. Imperfect fusion may result from the presence of foreign matter (such a slag, oxides, mill scale, or other nonmetallic substances) that prevents the underlying metal from reaching fusion temperature. This can be avoided by making certain that the joint is perfectly clean. Welding over loose mill scale may result in lack of fusion or extensive porosity or both because of moisture hydrated in the loose scale. Welds over tight scale may have re-entrants along the weld margin where the tight scale has hindered the wetting action in the weld puddle. Failure to remove scale at the point where two plates are joined by a fillet weld will frequently result in the generation of sufficient gas to produce wormholes in the fillet weld.



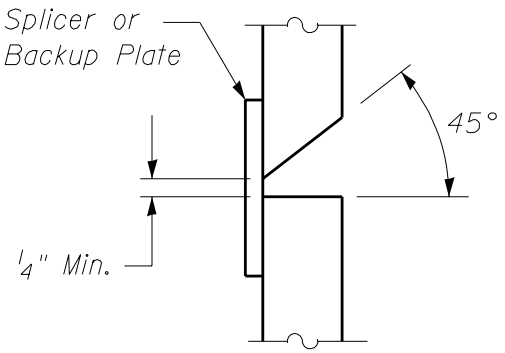
Common Types of Discontinuities

Type of Discontinuity	Location	Remarks
1) Porosity	W	Weld only, as discussed herein. (Porosity is also commonly found in castings.)
a) Uniformly scattered		
b) Cluster		
c) Linear		
d) Piping		
2) Inclusions	W	
a) Non-metallic slag		
b) Metallic tungsten		
3) Incomplete fusion (also called lack of fusion)	W	Found at joint boundaries or between passes.
4) Inadequate joint penetration (also called lack of joint penetration)	W	Found at root of weld preparation.
5) Undercut	BM	Found at junction of weld and base metal at surface.
6) Underfill	W	Found at outer surface of joint preparation.
7) Overlap	W	Found at junction of weld and base metal at surface.
8) Laminations	BM	Found in base metal, generally near mid-thickness of section.
9) Delamination	BM	Found in base metal, generally near mid-thickness of section.
10) Seams and laps	BM	Found at base metal surface. Almost always longitudinal.
11) Lamellar tears	BM	Found in base metal near weld HAZ.
12) Cracks		
a) Longitudinal	W, HAZ, BM	Found in weld or base metal adjacent to weld fusion boundary. Found in weld (may propagate from weld in HAZ and base metal.)
b) Transverse	W, HAZ, BM	Found in weld at point where it is terminated. Found at weld axis.
c) Crater	W	Found at junction between face of weld and base metal.
d) Throat	W	Found in weld metal at root.
e) Toe	HAZ	Found in base metal in HAZ (may propagate into unaffected base metal).
f) Root	W	Found in weld metal.
g) Underbeat and Heat Affected Zone	HAZ	
h) Fissures	W	

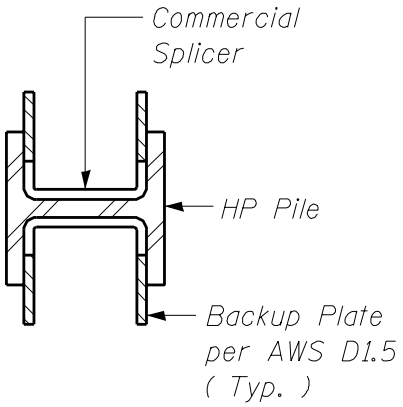
W-Weld
BM-Base Metal
HAZ -Heat Affected Zone



ELEVATION



DETAIL "A"

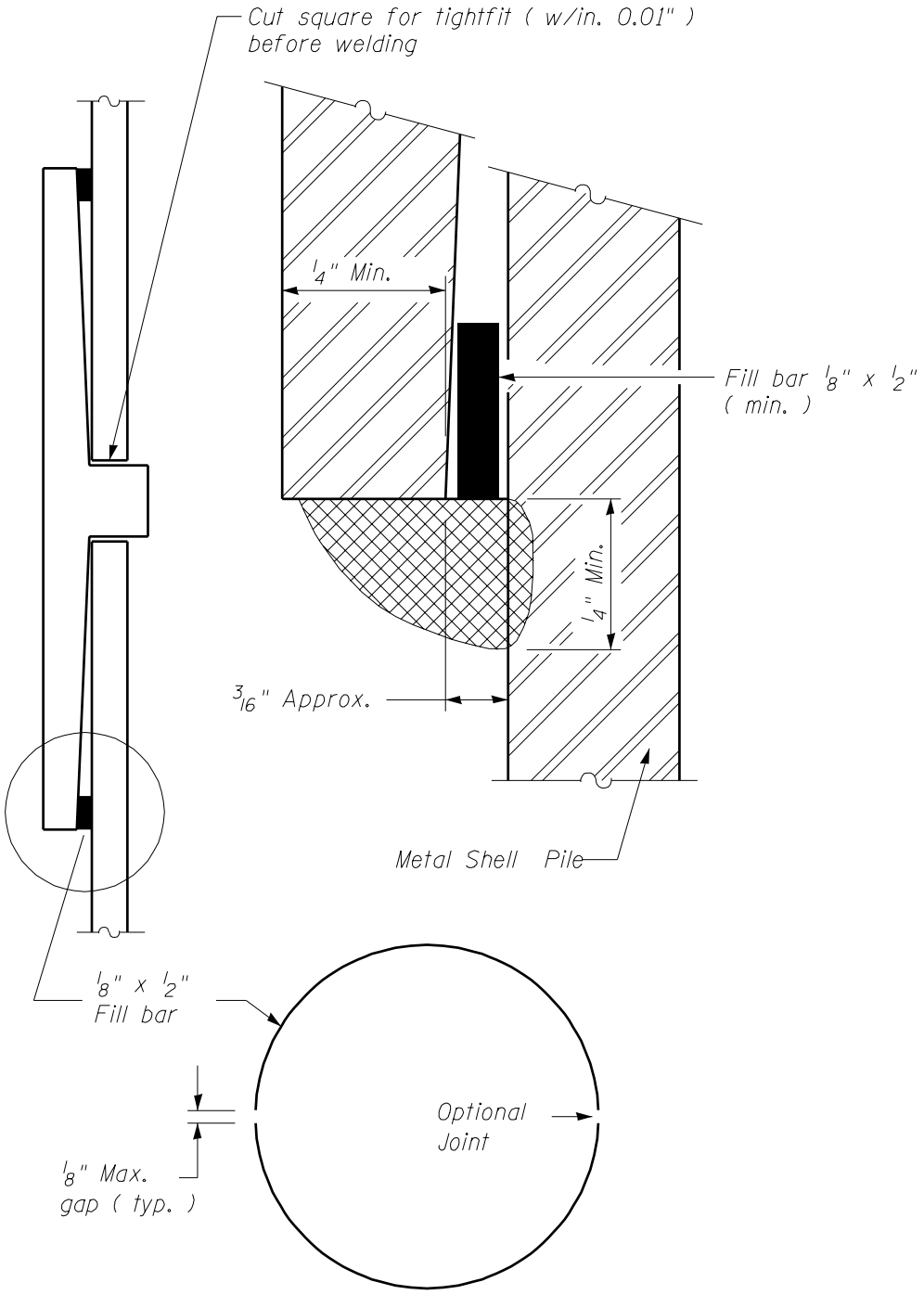


VIEW B - B

COMMERCIAL HP PILE SPLICE DETAILS
FOR SEISMIC PERFORMANCE CATEGORIES B & C

Commercial H-Pile Splice Detail for Seismic Performance Categories B & C.

The Resident Engineer should insure that the pile segments are completely driven into the splicer before the fillet welding is performed.



COMMERCIAL METAL SHELL SPLICE DETAIL FOR SEISMIC PERFORMANCE CATEGORIES B & C

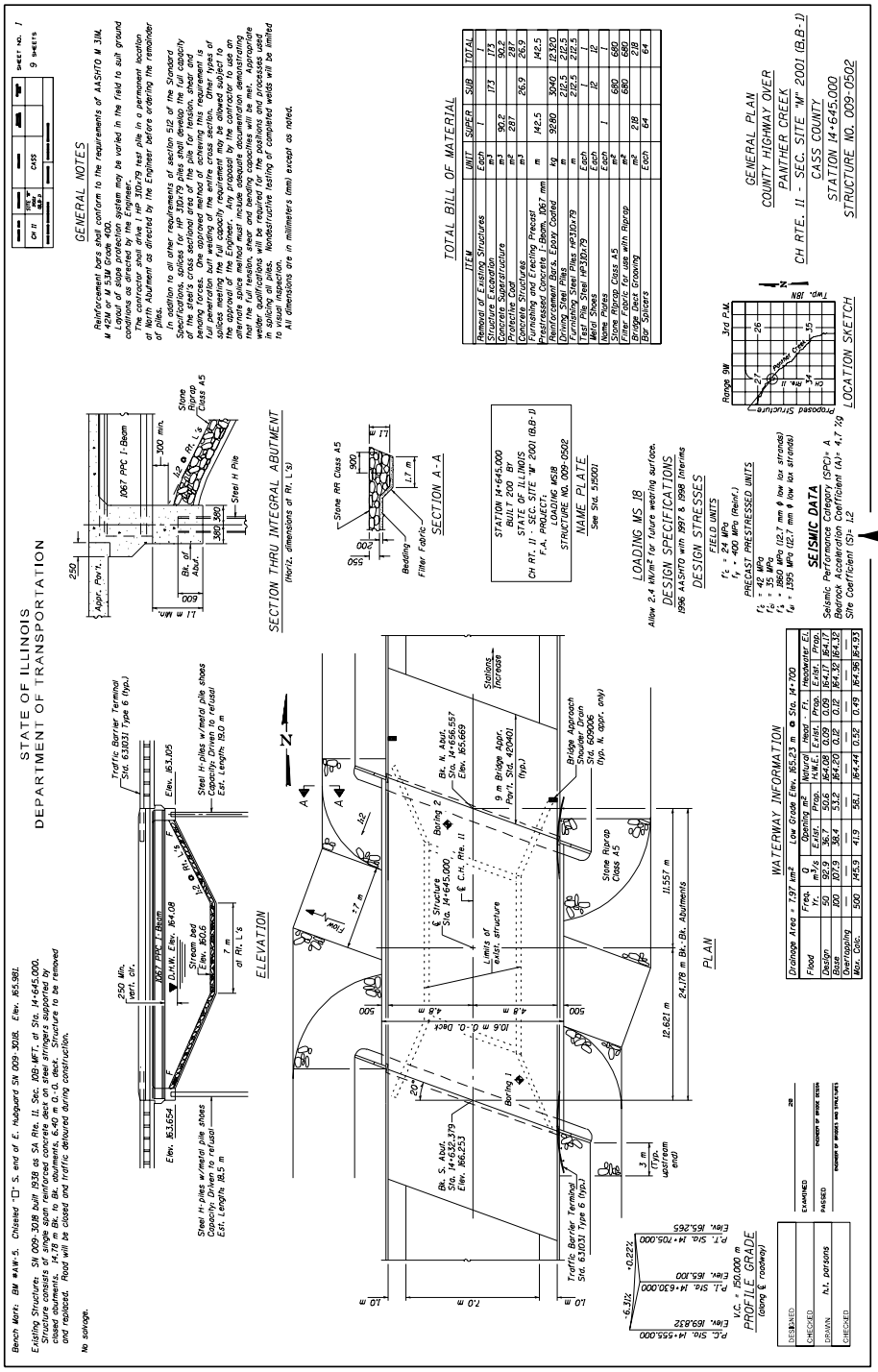
Commercial Metal Shell Splice Detail for Seismic Performance Categories B & C.

SEISMIC LEGEND	
Category	Horiz. Acceleration
A	≤ 9.0
B	> 9.0 to ≤ 19.0
C	> 19.0

From:
(AASHTO '91 Specs.)

Map of Horizontal Acceleration, A (expressed as percent of gravity) in Rock with 90 percent probability of not being exceeded in 50 years.

Prepared by the U. S. Geological Survey for the year 1988 edition of NEHRP Recommended provisions for the Development of Seismic Regulations for New Buildings.


STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
GENERAL NOTES
ELEVATION
SECTION THRU INTEGRAL ABUTMENT
SECTION A-A
PLAN
PROFILE GRADE
TOTAL BILL OF MATERIAL
WATERWAY INFORMATION
NAME PLATE
DESIGN SPECIFICATIONS
DESIGN STRESSES
LOADING MS 18
GENERAL PLAN
COUNTY HIGHWAY OVER
PANTHER CREEK
CH RTE. 11 - SEC. SITE "W" 2001 (B,B-1)
CASS COUNTY
STATION 14+645.000
STRUCTURE NO. 009-0502
LOCATION SKETCH
SEISMIC DATA
LOCATION FOR
NOTE INDICATING
SEISMIC DESIGN